

Mus. 4:462, 1856) from Santarem, Brazil, is in the British Museum (No. 21.1,438). The type male of *C. larvata* Taschenberg is at the Zoologisches Institut, Martin-Luther-University, Halle (Saale), Germany. I consider that *larvata* is only subspecifically distinct from *simplex*.

NOTES ON THE BIOLOGY AND DISPERSAL OF MELANOPHILA

(Coleoptera: Buprestidae)

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There have been many accounts of the attraction of several species of *Melanophila* to smoke and fire. Linsley (1943) summarized the pertinent literature and concluded that beetles of the subgenus *Melanophila* are normally attracted to forest fires and that they oviposit in scorched coniferous wood. Because these insects fly to smoke and are stimulated by heat, they are often attracted to several sources of smoke and heat, other than forest fires, such as oil fires (Van Dyke, 1926), burning sawdust and slash (Van Dyke, 1928), cement plants (Linsley, 1957; Linsley and Hurd, 1957), smelter plants (Linsley, 1933), tar extraction plants (Champion, 1918) and to sugar mills (Van Dyke, 1928). According to Linsley (1943) these insects appear to be attracted over long distances to these sources of fires (up to 60 miles in some cases), and there seems to be no doubt that normally they are able to detect smoke many miles away from forest fires and are able to fly great distances to the burnt over areas. In this manner dispersal takes place over a very large area.

The habit of flying to sources of heat and smoke is found in several species of *Melanophila*. Sloop (1937) separates the genus into three subgenera with the subgenus *Melanophila* characterized by the presence of a distinct pit contiguous to the lateral margin of the middle coxal cavity; and he reports that it is only those species with mesosternal pits that fly to fires. Although Sloop lists six of these species in North America, there are references to other species flying to fires in other parts of the world. Beeson (1941) mentions that in India the adults of *M. coriacea* Kerremans and *M. picta indica* Théry are attracted to forest fires and burnt trees, and Champion (1918) found specimens of *M. ignicola* Champion attracted to the heat and smoke from a tar extracting

plant in the Indian region of Kumaun. It is interesting to note that Poulton (1915-16) reports that another buprestid genus, *Merimna atrata* Hope, is attracted to bush fires in Australia, though an examination of specimens of this species shows that no pits are present on the mesothorax.

A method of dispersal of these insects, other than by flight, was observed at Edmonton, Alberta, during the summer of 1960. A plywood manufacturing plant was visited in June for the purpose of determining whether any species of *Melanophila* (which are widely distributed in Alberta) were attracted to the smoke emitted by a large kiln. Several adult specimens of *Melanophila acuminata* DeGeer were found and closer examination revealed that they were emerging from a large pile of spruce logs which had just been transported in from near the town of Chisholm, approximately 100 air miles north of Edmonton. Beetles continued to emerge from the logs throughout the summer and early fall in such numbers that several thousand were taken to the laboratory for use in various experiments. From these observations it may be inferred that, at least *acuminata* may be transported over long distances in logs to lumber yards and pulp mills and that its presence in areas where conifers do not grow does not necessarily indicate that it flew to these areas.

The specimens of *acuminata* taken to the laboratory were kept in half pint fruit jars with screen lids. The jars contained water and pieces of spruce bark for the beetles to walk on. About twenty specimens were kept in each jar, and it was observed that as soon as any died and were on their backs, they were attacked and eaten by the others. Freshly killed larvae of *Tribolium destructor* were then put in the jars and these were soon consumed, but when living larvae were put in they were not attacked as long as they were able to move. When dead insects such as *Tribolium* larvae, *Tenebrio* larvae, *Musca* adults and *Melanophila* adults were eaten the integuments were torn open and the blood and soft inner parts consumed, leaving the hard cuticle. All captured specimens of *M. acuminata* which were brought to the laboratory and supplied with water and freshly killed *Tribolium* larvae lived from two to three weeks. Craighead (1950) states that buprestid adults generally feed on pollen, foliage or the tender bark of trees, but species of *Melanophila* probably feed on dead insects which are quite prevalent in forest areas, especially in freshly burnt over areas.

There appeared to be no difference in preference for *Tribolium* larvae killed by decapitation or by scorching on a hot plate. When *M. acuminata* is enclosed in a field cage it readily feeds on the many flies and other small insects which get caught on the screen. It is possible that some of these smaller insects are eaten before they are dead, in which case *acuminata* is a true predator.

Some preliminary work was done on the behavior of *acuminata* and on the histology of the mesosternal pits during the summers of 1959-60. While the results of this work will be published later, it appears that each pit contains a cluster of olfactory organs of unusual shape, which are capable of detecting smoke in very low concentrations. It also appears that temperature and humidity receptors are present on the antennae. Yet the habit of flying to and depositing eggs in scorched trees is not obligatory for the survival of *acuminata*, even though it possesses highly specialized sensory organs which enable it to detect fires from considerable distances. Oviposition takes place in conifers cut for lumber and probably in conifers killed by other agencies such as lightning and disease. But a facultative ability to exploit trees killed by forest fires has, no doubt, contributed to the success and wide distribution of these insects.

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BOOK NOTICES

BIONOMICS, SYSTEMATICS, AND PHYLOGENY OF *LYTTA*, A GENUS OF BLISTER BEETLES (Coleoptera, Meloidae). By R. B. Selander. Urbana: The University of Illinois Press. Illinois Biological Monographs, No. 28: vi + 295 pp., [1 +] 350 figs. December 30, 1960. Paperbound, \$4.50; clothbound, \$5.50.

This is basically a phylogenetic study, and results in two sets of keys. One lot, to subgenera, groups, subgroups and species is phylogenetic and intended to summarize the principal differences between taxa; a separate artificial key for the ready identification of males and females of the North American species is given on pp. 35-49. The Old World components are studied less fully than ours, because of lack of material, though three of five new subgenera proposed are for them. The Nearctic *Poreospasta* Horn and *Pomphopoea* LeConte are included as subgenera of *Lytta*. For the first time there is an adequate treatment of the variations within the North American species, based in good part on Selander's own extensive field work. Clines are cited, and single character or discordant geographic variation discussed; where there is concordant geographic variation, subspecies are recognized but given only vernacular names.—HUGH B. LEECH, *California Academy of Sciences, San Francisco*.

The following two items are New York issues, by The Macmillan Company, of volumes from the well-known English series "The New Naturalist Library").

INSECT MIGRATION. By C. B. Williams, xiv + 235 pp., 49 text figs. (chiefly maps and charts), pls. I-XVI in black and white, 1-8 in color. 1958. \$6.00.

A stimulating work by a master of the subject. There are introductory chapters on insect migration, four on the evidence of migrations by insects of various orders and in different parts of the world, eight on the many and fascinating problems involved, three on marking live specimens, studying one's findings, and the literature on the subject.

COLLECTING, PRESERVING AND STUDYING INSECTS. By Harold Oldroyd. 327 pp., 135 figs in text, I-XV on un-numbered plates. 1958. \$6.00.

A well-written and satisfactorily illustrated book which has a detailed yet broad coverage. For instance it includes a chapter on photographing insects, in which there is much basic information, and explanations of the "why"; while the chapter on the construction and use of keys contains one to the orders of adult insects as an example.—HUGH B. LEECH, *California Academy of Sciences, San Francisco*.